

WHAT IS CLAIMED IS:

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A local area network for data communication, sensing, and control comprising a plurality of serial intelligent cells interconnected exclusively by electrically-conducting media into at least one communicating pair, wherein:

- 5 (a) each of said electrically-conducting media interconnects no more than two of said serial intelligent cells;
- (b) each of said at least one communicating pair includes one of said electrically-conducting media and exactly two of said serial intelligent cells;
- 10 (c) each of said at least one communicating pair engages in a communication exclusively over said electrically-conducting media; and
- (d) each of said at least one communicating pair engages in said communication bidirectionally and independently of the
- 15 communication of any other of said at least one communicating pair.

2. The local area network as in claim 1, wherein said communication is exclusively point-to-point communication.

3. The local area network as in claim 1, wherein the topology is a circular topology.

20 4. The local area network as in claim 1, wherein at least one of said electrically-conducting media includes electrical power wiring of a building.

5. The local area network as in claim 1, wherein at least one of said electrically-conducting media includes telephone wiring of a building.

6. The local area network as in claim 1, wherein at least one of said electrically-conducting media is used for both local area network data and for telephony.

7. The local area network as in claim 6, wherein the local area network data and telephony are combined by frequency-domain multiplexing.

8. The local area network as in claim 1, wherein at least one of said plurality of serial intelligent cells is powered from an electrical power main.

9. The local area network as in claim 1, wherein at least one of said plurality of serial intelligent cells can deliver electrical power.

10. The local area network as in claim 1, wherein at least one of said electrically-conducting media is used to carry both local area network data and electrical power.

11. The local area network as in claim 10, wherein the local area network data and electrical power are combined using frequency-domain multiplexing.

12. The local area network as in claim 1, wherein at least part of at least one of said plurality of serial intelligent cells is housed within a telephone outlet.

13. The local area network as in claim 12, wherein the telephone outlet allows connections to telephone services and to the local area network.

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14. The local area network as in claim 1, wherein at least part of at least one of said plurality of serial intelligent cells is housed within an electrical outlet.

15. The local area network as in claim 14, wherein the electrical outlet allows connections to electrical power and to the local area network

5 16. The local area network as in claim 1, wherein telephony is digitally integrated into the local area network data.

17. The local area network as in claim 1, wherein at least one of said plurality of serial intelligent cells includes an address.

Sub B 18. The local area network as in claim 17, wherein said address is assigned
10 via a method selected from the group consisting of manual assignment and automatic assignment by the local area network.

19. The local area network as in claim 1, wherein at least one of said plurality of serial intelligent cells receives electrical power locally.

20. The local area network as in claim 1, wherein at least one of said
15 plurality of serial intelligent cells receives electrical power via a dedicated power line.

21. The local area network as in claim 1, wherein at least one of said plurality of serial intelligent cells comprises:

- (a) a line interface;
- (b) a modem;
- 20 (c) a control block; and
- (d) a power supply.

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22. The local area network as in claim 1, wherein at least one of said plurality of serial intelligent cells receives electrical power via said electrically-conducting media.

23. The local area network as in claim 22, wherein at least one of said plurality of serial intelligent cells comprises a telephony/data splitter/combiner.

24. The local area network as in claim 22, wherein at least one of said plurality of serial intelligent cells comprises a power/data splitter/combiner.

25. The local area network as in claim 24, wherein said power/data splitter/combiner comprises an AC power/data splitter/combiner.

26. The local area network as in claim 24, wherein said power/data splitter/combiner comprises a DC power/data splitter/combiner.

Sub 327. The local area network as in claim 21, wherein at least one of said plurality of serial intelligent cells further comprises:

(e) a payload interface; and

(f) at least one device selected from the group consisting of a sensor and an actuator.

28. The local area network as in claim 21, wherein at least one of said plurality of serial intelligent cells further comprises:

(e) a communications interface.

29. The local area network as in claim 21, wherein at least one of said plurality of serial intelligent cells further comprises:

(e) a computer bus connector.

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31. The local area network as in claim 21, wherein at least one of said plurality of serial intelligent cells further comprises:

32. The local area network as in claim 31, wherein one of said plurality of serial intelligent cells is interconnected to a public telephone network interface.

34. The local area network as in claim 33, functioning as a voice multiplexer, wherein at least one of said plurality of serial intelligent cells is connected to a telephone.

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